Space Weather Forecast

Issued on Monday, 12 February 2024 at 12:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME arrivals possible from late 12 Feb until early 14 Feb (day 1-3), with G1 Minor Storm intervals likely and a chance of G2 Moderate Storms. M-flares likely. S1 Minor solar radiation storm expected to continue day 1, perhaps into day 2.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity was Moderate with one mid- level Moderate-class flare observed from the largest active region on the visible disc, located in the southwest. Another low- level Moderate-class flare was observed from a region beyond the northeast limb at 11/2245 UTC. The large active region in the southwest has been losing small spots as it matures, although a small opposite polarity spot has emerged to the north of the main leader spot, maintaining this region's complexity. The northeast developing region saw the most notable growth while the other region had some small spots emerge to its north. There are seven regions currently on the disc, however all other regions are smaller and simpler. Two further regions are expected to soon rotate into view from the eastern solar horizon.

No Earth directed CME's (coronal mass ejections) were observed, however a significant far-sided eruption produced a large and fast CME from beyond the southwest limb. Initial analysis has been undertaken, and although model results are pending, the resulting CME is expected to be well off the Sun-Earth line.

Solar Wind / Geomagnetic Activity: Solar winds showed ongoing CME influence, initially elevated with occasional strong peaks, but have reduced erratically since midnight UTC, still elevated but dipping to slightly elevated at times. Interplanetary Magnetic Field was weak with a slight downward trend since midnight UTC. The north-south component also varied weakly. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) started the period above the S1 Minor Radiation Storm level, but fell below at 11/1805 UTC. However, the S1 Minor Radiation Storm level was breached again soon after 12/0800Z, rising to a current peak of 571 pfu at 12/1140UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity likely to persist with further Moderate flares, and a slight chance of Strong flares. These perhaps most likely from the large region in the southwest, but with an increasing potential from the other developing regions, along with new regions moving onto eastern disc.

Solar Wind / Geomagnetic Activity: Multiple CME arrivals are possible day 1-2 (12-13 Feb) with ongoing effects likely day 3 (14 Feb), Otherwise current elevated winds are likely to gradually ease day 1 (12 Feb), before any CME enhancements ease occur. Any enhanced solar

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wind environment then easing day 4 (15 Feb). Mainly Quiet geomagnetic conditions at first are likely to become Active with a chance of G1 Minor Storms day 1, and likely rising to G1 Minor Storm with a chance G2 Moderate Storms day 2 (12-13 Feb). These conditions continuing day 3 (14 Feb) before easing to mainly Quiet day 4 (15 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) has become enhanced again following a large far-sided flare and CME eruption from beyond the southwest limb. The S1 Minor Radiation Storm level was breached soon after 12/0800Z and is now expected to continue at S1 levels for much, if not all of the rest of day 1 (12 Feb), perhaps continuing into day 2 (13 Feb). Further enhancements are possible associated with potential CME arrivals from later day 1 into day 2, along with any significant flares from the large sunspot region in the southwest.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	No	25	60	40	1
Strong	**G3**	No	5	15	10	1
Severe	**G4**	No	1	2	1	1
Extreme	**G5**	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 M Class**	Yes	75	75	75	75
Very Active	**R3 to R5 X**	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	100	60	30	15
Very Active	**≥ S3 ***	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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